**Title: Ellipses Activity……Mr. Mathras**

**Purpose:** To investigate the construction of an ellipse and to be able to recognize its major axis, semi-major axis and focal points and to be able to compute its eccentricity.

**Materials**: cardboard, string, metric ruler, two tacks

**Hazards:** Don't hurt your little self on the tack points!!

**NOTE:** All measurements below are to be made to the nearest 0.1 cm.

**Procedure:** 1. Find and mark the exact center point of your blank paper.
2. Orienting your paper in the "landscape" mode, mark a focal point exactly 5.0 cm to each side of the center point. Place your paper on top of the cardboard pad and LIGHTLY insert a thumb tack into each focal point. DO NOT PUSH IN ALL THE WAY TO THE HEAD OF THE TACK!!
3. Make a loop with your string so that it measures 16 cm from end-to-end when pulled taut. Place your loop around BOTH tacks. With your pen/pencil tip also inside the loop and held vertically, pull the loop taut and trace an ellipse on your paper as shown in **Figure 1** below. Label this **Ellipse #1** at the 11 o'clock position**.**
4. Measure and record the length of the major axis (the longest distance from the left edge to the right edge of this ellipse, passing through the center point) on a data chart similar to **Figure 2** below.
5. Measure and record the length of the semi-major axis (the distance from the center point to either the left or right edge).
6. Measure and record the distance between the foci
7. Compute the eccentricity of this ellipse, using the formula :

**Eccentricity = Distance between foci/ major axis**

8. Repeat steps 1-7 above on the same side of the paper, placing the foci 1.0 cm to each side of the center point and making your string loop 9.0 cm when pulled taut. Label this **Ellipse #2** at the 10 o'clock position.
9. Repeat steps 1-7 above using only one tack at the center point, keeping the string loop at 9.0 cm. Label this **Circle #3** at the 9 o'clock position.

**Conclusion:** 10. The flatter an ellipse, the ……..its eccentricity. The eccentricity of an ellipse approaches ……, the more circular its shape becomes.
11. The eccentricity of any circle is ……..
12. An ellipse whose two foci are right on top of each other is really a (an) ……

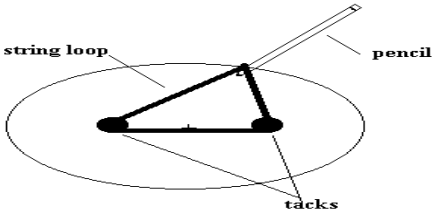

Figure 1

| | Ellipse #1 | Ellipse #2 | Circle #3 |
|---|---|---|---|
| Major axis | | | |
| Semi-major axis | | | |
| Dist. between foci | | | |
| Eccentricity | | | |

Figure 2